

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 to 7.

The above amendment is responsive to points set forth in the Official Action.

In connection with the above amendment to claim 1, support is found at page 19, lines 14, to 24 in the present specification.

With regard to Official Action paragraph 1, it is apparent the term "adsorbent" is appropriate and is employed throughout the specification. Accordingly, such term has employed throughout the claims.

With regard to Official Action paragraph 4, the Examiner's suggestion has been adopted in claim 5.

The indication that claim 7 would be allowable if rewritten in independent form is acknowledged with appreciation, however, for reasons set forth below, it is considered that all of the claims in this application are now in condition for allowance.

Turning to the rejection of prior art, claims 1 to 6 have been rejected under 35 USC 102 (b) as anticipated by Carnell et al. (GB 2281077A).

This rejection is respectfully traversed.

According to above amended claim 1, carbon dioxide is added to desulfurized natural gas, and the amount of carbon dioxide is specified in terms of the molar ratio between methane (CH_4) in the natural gas and carbon dioxide (CO_2), in the range of: $\text{CH}_4:\text{CO}_2 = 1 : 1$ to $1 : 3$. With this feature, as described in the specification, at page 19, lines 14 to 24, a synthesis gas containing hydrogen gas, carbon monoxide and carbon dioxide with a molar ratio of H_2/CO ranging from 1 to 2.5 can be manufactured. The synthesis gas with such a molar ratio of H_2/CO is suitable for the synthesis of gasoline, kerosene and gas oil by way of the Fisher-Tropsch reaction system, or the synthesis of methanol or dimethyl ether at low cost.

Carnell et al. (GB 2281077A) discloses that a hydrocarbon feedstock containing hydrogen sulfide and carbon dioxide is passed through a separation membrane so as to produce a permeate stream which contains at least carbon dioxide and sulfur compound, and an impermeate stream.

Further, the permeate stream is combusted as a fuel, thereby recovering energy from the combustion compounds. On the other hand, the impermeate stream is desulfurized by passing it over a bed of a granular catalyst for hydrogen sulfide, and steam is added to the desulfurized impermeate stream so as to reform the mixture gas of the steam and the desulfurized impermeate stream with a reforming catalyst.

Carnell et al. further mentions a catalyst for hydrogen sulfide, which is similar to that of the present invention. However, this reference provides no disclosure or suggestion of the technique as recited in above-amended claim 1, i.e. where carbon dioxide is added to desulfurized natural gas, and the amount of carbon dioxide is specified, in terms of the molar ratio between methane in the natural gas and carbon dioxide in the range of: $\text{CH}_4:\text{CO}_2 = 1 : 1$ to $1 : 3$.


For the foregoing reasons, it is apparent that the rejection on prior is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned at the telephone or facsimile number below.

Respectfully submitted,

Masaki IJIMA et al.

By: 
Matthew Jacob
Registration No. 25,154
Attorney for Applicants

MJ/jlg
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
May 12, 2003

**Version with Markings to
Show Changes Made**

1. (Amended) A method of manufacturing a synthesis gas containing hydrogen and carbon monoxide, which comprises steps of;

removing only hydrogen sulfide from a natural gas containing hydrogen sulfide and carbon dioxide by permitting the natural gas to pass through a hydrogen sulfide-removing device filled with a hydrogen sulfide [absorbent] adsorbent;

adding carbon dioxide and steam to the natural gas from which the hydrogen sulfide has been removed to prepare a mixed gas; and

feeding the mixed gas into a reaction tube of a reformer, thereby permitting mainly a steam reforming reaction to take place in the mixed [gas.] gas,

wherein the molar ratio between methane (CH_4) in the natural gas and carbon dioxide (CO_2) falls within the range of $\text{CH}_4:\text{CO}_2 = 1 : 1$ to $1 : 3$ on the occasion of adding steam and carbon dioxide to the natural gas.

5. (Amended) The method of manufacturing a synthesis gas according to claim 1, wherein the hydrogen sulfide adsorbent is at least one oxide selected from the group consisting of triiron tetraoxide (Fe_3O_4) and zinc oxide (ZnO).